UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEW HAMPSHIRE

Presstek, Inc.

v. Case No. 05-cv-65-PB
Opinion No. 2008 DNH 034

Creo, Inc. & Creo Americas, Inc.

SEALED MEMORANDUM AND ORDER

In this patent infringement action by Presstek, Inc. against Creo, Inc. and Creo Americas, Inc. (collectively "Creo"), Creo has moved to exclude the opinions of Presstek's expert witness Dr. Samuel Gido under Fed. R. Evid. 104(a) and 702 and the principles set forth in Daubert v. Merrell Dow Pharms., Inc., 509 U.S. 579, 597 (1993). For the reasons described herein, I deny Creo's motion.

I. BACKGROUND

Presstek is the owner of U.S. Patent No. 5,353,705 (filed Sept. 22, 1993) ("the '705 Patent"), which discloses a multilayer lithographic printing plate suitable for laser imaging. See Presstek, Inc. v. Creo, Inc., No. 05-cv-65-PB (D.N.H. Mar. 30,

2007) (order construing the '705 Patent and denying Creo's motion for summary judgment). Such printing plates are employed in digital offset printing presses that use laser imaging, rather than more traditional photographic processes, to produce a printable image on the plate. A digital offset printing press works essentially as follows: first, a computer-controlled laser "images" the plate -- that is, selectively removes plate layers to create a pattern of ink-attracting and ink-repelling areas on the plate. After this imaging is completed, the plate is inked and then applied either directly to the final recording medium (usually paper) or to an intermediate blanket cylinder that in turn applies the image to the recording medium.

The '705 Patent describes a printing plate consisting of four layers: (1) a top layer, (2) a radiation-absorptive layer, (3) a secondary ablative layer, and (4) a durable substrate. Upon exposure to a laser beam, the top two layers fully ablate, the third layer partially ablates, and the substrate does not ablate.[1]

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[1] As used in the '705 Patent, the verb "ablate" means to decompose into gases and volatile fragments. Partial ablation means that a portion, but not all, of the third layer decomposes into gases and volatile fragments. See Presstek, Inc. v. Creo,

Presstek alleges that the Clarus WL, a lithographic printing plate manufactured by its competitor Creo, infringes on the '705 Patent. The Clarus WL operates on the same general principle as the plate described in the '705 Patent: a multilayered plate that, once imaged by a laser that selectively removes certain layers, develops a pattern of ink-attracting and ink-repelling surfaces that can be inked and applied to a recording medium.

Clarus WL plates are assembled by a Creo subcontractor as follows: First, the subcontractor obtains a length of Polyethylene Terephtalate ("PET") film, manufactured by SKC Inc. as product number SH-31. This PET film is laid down as the substrate. Next, a layer of infrared-absorbing carbon black/nitrocellulose is applied to the PET substrate. Finally, a silicone layer is applied on top of the carbon black layer. Creo contends that the Clarus WL does not infringe the '705 Patent because it does not contain the four claimed layers, but rather consists of only three layers: the silicone layer, the carbon black layer, and the PET layer.

Presstek contends that the Clarus WL infringes the '705

Inc., No. 05-cv-65-PB (D.N.H. Mar. 30, 2007) (order construing the '705 Patent and denying Creo's motion for summary judgment).

Patent because the PET film actually consists of two sublayers: an upper amorphous layer and a lower semi-crystalline layer.[2] Thus, Presstek argues, the Clarus WL consists of a total of four layers: (1) a top layer of silicone, (2) a radiation-absorptive carbon black layer, (3) a secondary ablative layer of amorphous PET, and (4) a substrate of semi-crystalline PET. Presstek further contends that the amorphous PET layer (the "third layer") partially ablates during laser imaging.

Presstek relies on the opinion of Dr. Samuel Gido to show: (1) the Clarus WL's PET layer actually consists of two sub-layers, the upper one being amorphous and the lower one being semi-crystalline, and (2) the amorphous PET layer partially ablates during imaging. Dr. Gido is an Associate Professor of Polymer Science and Engineering at the University of Massachusetts, Amherst. He holds a Ph.D. in Chemical Engineering and Polymer Science and Technology from the Massachusetts Institute of Technology ("MIT") and a B.S.E. in Chemical

[2] In an amorphous state, the PET polymer chains are randomly intermingled with one another. In a crystalline state, the polymer chains are ordered and aligned with each other. In a semi-crystalline state, the polymers are more ordered than in an amorphous state, but still somewhat intermingled with one another.

Engineering from Princeton University. His field of expertise is polymer structure and morphology, and he has extensive experience using electron microscopy and atomic force microscopy in that field. He has authored or co-authored sixty-seven articles in peer-reviewed publications and given numerous lectures in his field.

As discussed in more detail below, Creo has moved to exclude Dr. Gido's testimony both as to the structure of the PET film and as to partial ablation of the PET during imaging.

A. Dr. Gido's Testing

To conduct his tests, Dr. Gido obtained two rolls of Clarus WL plates. He left one roll un-imaged. He took the other roll to a press operator who, using a direct imaging laser press, imaged a test pattern consisting of various lines and dots onto the roll.

1. Testing of Un-Imaged Roll

Dr. Gido chilled the plate to -60°C and used a microtome to take thin cross-sections of the plate. He then used transmission electron microscopy ("TEM") to inspect the silicone and carbon black layers. Based on his examination of the TEM images, Dr.

Gido concluded that the silicone and carbon black layers had a combined thickness of approximately 0.5 µm. (After further testing, Dr. Gido later revised this figure to 1.3 µm.[3]) Next, Dr. Gido used selected area electron diffraction ("SAED") to determine the structure of the PET material. To minimize the risk of beam damage, he calibrated his instruments using areas from which data was not recorded, and then used a narrow spot size, low power settings, and short exposure times to record the actual data. Using these techniques, Dr. Gido took diffraction patterns in three vertical columns, starting near the interface with the carbon black layer and proceeding in steps approximately 2 µm apart, progressing from the top to the bottom of the PET layer. Based on these diffraction patterns, Dr. Gido determined that the PET was amorphous in the top 6-7 µm from the interface with the carbon black layer, but semi-crystalline from there to

[3] Dr. Gido's 0.5 µm measurement was erroneous because the silicone top layer had peeled away during preparation of the samples. In his supplementary report, Dr. Gido attempted to more accurately measure the thickness of the silicone and carbon black layers by first depositing a gold coating approximately 0.5 µm thick onto the imaged side of the roll. This gold coating was used to mark the location of the upper surface and ensure that it remained in place for microtoming. Using SEM micrographs, Dr. Gido concluded that the silicone and carbon black layers had a combined thickness of approximately 1.3 µm, not 0.5 µm.

the bottom.

2. Testing of Imaged Roll

After the roll was imaged, the press operator ran about one hundred paper copies of the pattern and confirmed that the pattern had imaged properly. He then imaged the test pattern on other sections of the roll and turned the entire roll over to Dr. Gido.

Using the same techniques as with the un-imaged roll, Dr. Gido performed TEM and SAED imaging on cross-sections of the imaged roll. He found that the imaged roll had the same layer structure as the un-imaged roll.

Dr. Gido then microtomed a cross-section of the plate, such that one of the test pattern lines imaged into the plate was visible in cross-section, and used a scanning electron microscope ("SEM") to view the edge profile. From the SEM image, Dr. Gido concluded that the laser had caused ablation to a depth ranging from 1.3 to 2.0 μm, depending on the exact location measured. Using his previous measurements of the silicone, carbon black, and PET layers, Dr. Gido concluded that the line extended partially into the amorphous PET layer.

Dr. Gido then used atomic force microscopy ("AFM") to plot the topography of the top surface of the plate. The AFM measurements indicated that for lines in the test image, the average difference in height between the top surface and the bottom of the imaged line was 1.36 μm, with a standard deviation of 0.11 μm. Similarly, the AFM measurements indicated that for dots in the test image, the average difference in height was 1.77 μm, with a standard deviation of 0.10 μm.

Based on the SEM and AFM depth measurements, along with the absence of any carbon black material in the imaged areas, Dr. Gido inferred that the laser fully ablated the carbon black layer and partially ablated the amorphous PET layer.

II. STANDARD

Fed. R. Evid. 702 envisions a gatekeeping role for trial courts in which they screen the admission of expert testimony for both reliability and relevance. United States v. Diaz, 300 F.3d 66, 73 (1st Cir. 2002). In this gatekeeping role, the trial court must evaluate whether a qualified expert's testimony by determining whether: "(1) the testimony is based upon sufficient facts or data, (2) the testimony is the product of reliable

principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case." Fed. R. Evid. 702. The party seeking the admission of expert testimony bears the burden of demonstrating these facts by a preponderance of the evidence. United States v. Mooney, 315 F.3d 54, 63 (1st Cir. 2002).

The factors that will generally assist a trial court in making this determination are: "(1) whether the theory or technique can be and has been tested; (2) whether the technique has been subject to peer review and publication; (3) the technique's known or potential rate of error; and (4) the level of the theory or technique's acceptance within the relevant discipline." United States v. Mooney, 315 F.3d 54, 62 (1st Cir. 2002) (citing Daubert, 509 U.S. at 593-94). "These factors, however, are not definitive or exhaustive, and the trial judge enjoys broad latitude to use other factors to evaluate reliability." Id.; see Daubert, 509 U.S. at 593 ("Many factors will bear on the inquiry, and we do not presume to set out a definitive checklist or test").

Although a court may exclude an expert's opinion because it "is connected to existing data only by the *ipse dixit* of the

expert" and "there is simply too great an analytical gap between the data and the opinion proffered," Gen. Elec. Co. v. Joiner, 522 U.S. 136, 146 (1997), the primary focus of the inquiry is on the expert's "principles and methodology, not on the conclusions that they generate." Daubert, 509 U.S. at 595. As the Supreme Court has emphasized, "[v]igorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence." Id. at 596.

III. ANALYSIS

I must address one preliminary matter before proceeding to the substantive analysis. Creo has moved to exclude the rebuttal declarations of Drs. Carlson and Gido (both provided by Presstek as exhibits to its Opposition to Defendants' Motion to Exclude Expert Opinions of Dr. Samuel Gido) because it contends that the disclosures are untimely and in violation of Rule 26. However, Presstek submitted these declarations for the sole purpose of rebutting Creo's Daubert arguments, not to introduce them for evidentiary purposes at trial. Thus, these declarations are not improper supplemental disclosures; they merely respond to the

criticisms levied by Creo's Daubert motion and give additional insight into the experiments that Dr. Gido has already conducted. Insofar as Creo seeks to preclude the court from considering these declarations for Daubert purposes, I deny that motion.

Turning to the merits, Creo focuses on two aspects of Dr. Gido's report that allegedly fail to satisfy Daubert: first, Dr. Gido's opinion regarding the existence of an amorphous PET layer; and second, his opinion that the PET partially ablated during imaging. For the reasons discussed below, both aspects of Dr. Gido's report are admissible under Rule 702.

A. Existence of Amorphous PET Layer

Creo argues that Dr. Gido's testimony as to the existence of an amorphous PET layer should be excluded because: (1) Dr. Gido's conclusion is implausible on its face; (2) Dr. Gido's SAED procedures were so likely to cause radiation damage to the sample that they were scientifically unreliable; (3) even if his SAED procedures did not damage the sample, Dr. Gido took an insufficient number of SAED patterns; (4) Dr. Gido failed to test the top 1 µm of the PET; and (5) Dr. Gido failed to test reference PET samples. None of these arguments justifies the exclusion of Dr. Gido's testimony under Rule 702.

1. <u>Implausibility of Conclusion</u>

Creo first argues that Dr. Gido's testimony should be excluded because his conclusion that the Clarus WL's PET has an amorphous top layer is implausible on its face. Specifically, Creo argues that such a conclusion is inconsistent with the properties of most biaxially-oriented PET and with the particular manufacturing processes used to create SH-31 PET. Thus, Creo argues, Dr. Gido's conclusions could only be correct if Creo or its subcontractors did something unusual to the PET to create an amorphous upper layer, an allegation which Creo denies.

Whatever the ultimate factual merits of Creo's argument may be, it only calls into question the plausibility of Dr. Gido's *conclusions*, not the underlying principles, methodology, or inferential leaps he made to support those conclusions. Thus, it goes only to the weight, not the admissibility, of Dr. Gido's testimony. <u>See</u> <u>Daubert</u>, 509 U.S. at 595 ("The focus . . . must be solely on principles and methodology, not on the conclusions that they generate"); <u>Ruiz-Troche</u>, 161 F.3d at 85 ("<u>Daubert</u> does not require that a party who proffers expert testimony carry the burden of proving to the judge that the expert's assessment of the situation is correct"). Accordingly, this critique is not a

proper basis for excluding Dr. Gido’s testimony.

2. Considering and Minimizing SAED-induced Damage to Plate

Creo next argues that Dr. Gido’s testimony should be excluded because his SAED procedures were so likely to cause radiation damage to the PET samples that they were scientifically unreliable, and that his conclusions are in fact false amorphous results attributable to radiation damage. Importantly, neither criticism attacks Dr. Gido’s basic decision to use SAED; Dr. Michael Rubner, one of Creo’s experts, himself admits that SAED may be used to determine whether a polymer sample is crystalline or amorphous. Rather, Creo is criticizing the particular beam settings and techniques that Dr. Gido used to minimize the risks of beam damage.

I am satisfied that Dr. Gido’s SAED procedures were derived from reliable principles, using generally accepted techniques to minimize the risks of beam damage. To minimize the risk of beam damage, Dr. Gido began by calibrating his instruments using areas from which data was not recorded, testing the sensitivity of the PET to beam damage. For recording the actual data, he used a narrow spot size, low power settings, and short exposure times. Such low-dose techniques are commonly used in peer-reviewed

studies to prevent beam damage. See Shujun Chen et al., Oriented Lamellar Structure and Pore Formation Mechanism in CSX-Processed Porous High-Density Polyethylene, 39 Macromolecules 2849, 2851 (2006) (co-authored by Dr. Gido) ("[C]are was taken to limit unnecessary electron beam exposure, thus minimizing electron beam damage and producing the best possible electron diffraction patterns. This included such standard procedures as focusing on an adjacent area to the area where data was recorded, using the smallest possible spot size, limiting the spread of the beam, and turning the beam off when it was not needed."); Lawrence F. Drummy et al., Imaging of Crystal Morphology and Molecular Simulations of Surface Energies in Pentacene Thin Films, 110 J. Physical Chemistry 6066, 6067 (2006) (noting that low-dose TEM techniques were employed); Yu Shen et al., Microstructural Characterization of *Bombyx mori* Silk Fibers, 31 Macromolecules 8857, 8861 (1998) (describing low-dose SAED patterns); Regina Valluzzi et al., Orientation of Silk III at the Air-Water Interface, 24 Int'l J. Biological Macromolecules 237, 238 (1999) (co-authored by Dr. Gido) (noting that low-dose TEM techniques were employed).

In light of the reliability of Dr. Gido's methods, Creo's

further contention that Dr. Gido's low dosages and short exposure times nevertheless damaged the sample is not a proper Daubert challenge. That contention goes to the weight, not the admissibility, of Dr. Gido's opinion.

3. Number of Samples Taken

Creo argues that Dr. Gido's testimony should be excluded because he only took three vertical lines of samples (comprising a total of twenty-nine sample spots) for his SAED patterns.

Creo relies on Wessmann v. Gittens, 160 F.3d 790, 805 (1st Cir. 1998) for the proposition that lack of thoroughness or failure to exclude confounding variables is "unacceptable." That reliance is misplaced; the issue in Wessmann was not the admissibility of an expert report, but whether the expert's conclusions met the relevant burden of proof. See Wessmann, 160 F.3d at 805-06. Accordingly, Wessmann offers no useful guidance in the Daubert context. See Ambrosini v. Labarraque, 101 F.3d 129, 135 (D.C. Cir. 1996) ("[Expert] evidence does not warrant exclusion simply because it fails to establish the causal link to a specified degree of probability.").

In this case, Creo apparently concedes that Dr. Gido's general methodology of conducting multiple vertical SAED patterns

is reliable. The only issue is the number of SAED patterns that ought to be conducted. The scientific literature provides support for the idea of extrapolating from three or fewer TEM/SAED patterns to make generalizations about the morphology of entire polymer films or sheets of uniform composition. See, e.g., Chen, supra at 2852 (using a single SAED pattern to generalize about the morphology of an entire sheet of porous high-density polyethylene); Drummy, supra at 6067-68 (using two TEM/SAED patterns to generalize about the morphology of an entire pentacene thin film layer); S. Hong et al., Morphology of Semicrystalline Block Copolymers: Polyethylene-*b*-atactic-polypropylene, 42 Polymer 5909, 5911-14 (2001) (using two SAED patterns to generalize about the morphology of a uniform sample composed of a blend of a diblock copolymer and a polyethylene homopolymer); R. Valluzzi et al., *Bombix Mori* Silk Fibroin Liquid Crystallinity and Crystallization at Aqueous Fibroin-Organic Solvent Interfaces, 24 Int'l J. Biological Macromolecules 227, 229-32 (1999) (co-authored by Dr. Gido) (using one SAED pattern to generalize about the morphology of an entire silk fibroin film).

In this case, Dr. Gido is making generalizations about each horizontal plane of the Clarus WL plate based on three TEM/SAED patterns from that plane. One would expect from the manufacturing process for the Clarus WL that each horizontal plane should have uniform properties over its entire area. Thus, even though the peer-reviewed articles cited above all deal with surfaces considerably smaller than a Clarus WL plate, the underlying principle -- extrapolating from a small number of TEM/SAED patterns to make conclusions about the properties of an entire sheet of uniform composition -- is the same scientifically valid principle of extrapolation as that used in the literature. Accordingly, while Dr. Gido's decision to use only three vertical sets of SAED patterns for the entire Clarus WL plate casts doubt on the accuracy of his conclusions, it goes to the weight, not the admissibility, of those conclusions.

4. Testing of Top 1 μm

Creo argues that Dr. Gido's testimony should be excluded because he did not test the 1 μm of the PET immediately below the interface between the PET and the carbon black layers. Because of this omission, Creo argues, Dr. Gido has not excluded the possibility that the top 1 μm of the PET is semi-crystalline and

therefore cannot infer that it shared the amorphous properties of the underlying planes that he did test. Dr. Gido defends his decision by pointing to three factors: First, the aperture size of the electron beam (0.5 μm) makes it impossible to reliably take data in the upper 1 μm of the PET. Second, a diffraction pattern taken too close to the interface between the PET and the carbon black could end up measuring diffraction patterns from the carbon black as well as the PET, rendering the results meaningless. Third, taking a diffraction pattern in the upper 1 μm of the PET would put it in close proximity to the pattern immediately below it, creating a risk that the two patterns would overlap and damage the PET, rendering the results meaningless.

Although the merits of Dr. Gido's third objection appear dubious (presumably, Dr. Gido could have adjusted the other diffraction patterns another 0.5 μm lower to avoid any overlap between patterns), the first two provide substantial technical and practical reasons justifying Dr. Gido's decision not to test the upper 1 μm of the PET. Rule 702 does not demand that experts perform the impossible; it only requires the proponent to show that "the expert's conclusion has been arrived at in a scientifically sound and methodologically reliable fashion." See

Ruiz-Troche, 161 F.3d at 85. It would be irrational to exclude Dr. Gido's testimony on the ground that he refused to conduct additional tests that, in his scientific judgment, would be meaningless or misleading. Accordingly, I find that Dr. Gido's decision not to take diffraction patterns in the top 1 µm of the PET layer goes to the weight, not the admissibility, of his testimony.

5. Testing of Reference PET Samples

Creo argues that Dr. Gido's testimony should be excluded because although he performed TEM/SAED testing on both imaged and un-imaged samples of the Clarus WL, he did not perform TEM/SAED testing on PET samples with known properties, such as an unmodified sheet of SH-31 PET. While, as Creo notes, "[f]ailure to test for alternative causes or to use control experiments may provide a basis for exclusion," In re Omeprazole Patent Litig., 490 F. Supp. 2d 381, 402 (S.D.N.Y. 2007), it is also true that "experts are not required to perform every possible test" of alternative theories or causes for their testimony to be admissible. Id. at 461 (where plaintiff's drug chemistry expert concluded that the presence of acetone in the tested product explained certain inconsistencies in his mass spectrometry

results, it was not necessary for him to perform a "spiking" test to isolate the influence of acetone); see also Microstrategy, Inc. v. Business Objects, S.A., 429 F.3d 1344, 1355 (Fed. Cir. 2005) ("While an expert need not consider every possible factor to render a 'reliable' opinion, the expert still must consider enough factors to make his or her opinion sufficiently reliable in the eyes of the court").

In this case, testing other PET samples could have generated data relevant to Dr. Gido's hypothesis that the Clarus WL's manufacturing process somehow modified the SH-31 PET. Such data is not, however, necessary to support his conclusions. Dr. Gido's decision not to conduct such testing therefore does not make his existing analysis so incomplete that it would be inadmissible.

B. Partial Ablation of PET

Creo argues that Dr. Gido's testimony as to the existence of an amorphous PET layer should be excluded because: Dr. Gido did not directly observe ablation taking place; Dr. Gido failed to eliminate other possible explanations for the cratering of the PET; Dr. Gido's use of AFM and SEM to measure ablation was a "theory" developed solely for this litigation; Dr. Gido's

measurements of ablation depth were inconsistent with other information regarding the thickness of the Clarus WL's layers; and Dr. Gido's gold layering method was unreliable. None of these justifies exclusion under Rule 702.

1. No Direct Observation of Ablation

Creo argues that Dr. Gido's testimony should be excluded because he did not directly observe the PET decomposing into gases and volatile fragments during the imaging process, and instead simply measured the amount of PET removed from the plates after the imaging and cleaning processes were complete. Direct observation of ablation might well be more convincing to a fact-finder than indirect evidence, if such observation could reliably be performed inside a working printing press. But the role of the trial court as Daubert gatekeeper is a limited one. See Ruiz-Troche, 161 F.3d at 85 ("Daubert neither requires nor empowers trial courts to determine which of several competing scientific theories has the best provenance"). Daubert "demands only that the proponent of the evidence show that the expert's conclusion has been arrived at in a scientifically sound and methodologically reliable fashion." Id.

In this case, the mere fact that Dr. Gido relied on inferential reasoning (namely, examining the plate after imaging rather than attempting to collect evidence of ablation during the imaging process) rather than trying to directly observe ablation does not make his methods unscientific. Indeed, if inferential reasoning were held to be unscientific, then courts would be forced to treat whole swaths of scientific inquiry -- including most of astrophysics, geology, and evolutionary biology -- as inadmissible under Daubert. Such a result is plainly wrong. Accordingly, the mere fact that Dr. Gido relied on inferential reasoning to conclude that the PET ablated, without making direct observations of the ablation, is not a proper basis for excluding his testimony.

2. Failure to Eliminate Other Possible Explanations

Creo argues that Dr. Gido's testimony regarding ablation should be excluded because he did not account for the possibility that, rather than ablating, the missing PET was mechanically displaced from the Clarus WL plate by the post-imaging cleaning process or some other unknown process. This so weakens Dr. Gido's analysis, Creo argues, that the *ipse dixit* of Dr. Gido is

all that connects the data to his conclusion that the PET ablated during imaging. See Joiner, 522 U.S. at 146. A mere failure to exclude alternate explanations, however, generally goes to the weight and not the admissibility of expert testimony. See Currier v. United Techs. Corp., 393 F.3d 246, 252 (1st Cir. 2004) (finding that in age discrimination case, statistician's failure to take into account the wide difference in circumstances among terminated employees went to the weight, not the admissibility, of his testimony); McMillan v. Mass. Soc'y for the Prevention of Cruelty to Animals, 140 F.3d 288, 302-03 (1st Cir. 1998) (finding that even though an expert's statistical model "may not have included every relevant variable," it was relevant to the issue of disparate treatment and "it was up to defendants to exploit and discredit the analysis during cross examination"); Omeprazole, 490 F. Supp. 2d at 461 ("Plaintiffs' experts are not required to perform every possible test").

In this case, the post-imaging cleaning of the plate[4] is the only process other than the imaging itself that Creo has

[4] This cleaning process consists of a wet cleaning, dry cleaning, and then vacuuming by three devices that move across the surface of the plate.

identified as a possible means by which PET could be removed from the plate. Dr. Gido had empirically grounded, scientifically valid reasons for not conducting an in-depth investigation into the possibility that this cleaning process would affect his results. First, the mere fact that the sample was subjected to a cleaning process does not necessarily imply that the cleaning process interfered with the evidence of ablation. See M. Himmelbauer et al., Single-Shot UV-Laser Ablation of Polyimide with Variable Pulse Lengths, 63 Applied Physics A 87, 88 (1996) (partially ablated sample was cleaned with acetone before using AFM to investigate extent of ablation). Second, because the cleaning process moves across the un-imaged as well as the imaged portions of the plate, any cleaning process that is sufficiently aggressive to remove pieces of PET would likely also damage the overlying silicone and carbon black layers. Dr. Gido found no evidence of such damage, so he reasonably concluded that the cleaning process probably did not remove any un-ablated PET.[5]

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[5] Moreover, as Presstek points out, it is difficult to believe that print shops would choose to buy a press that employed such a destructive cleaning process. Any cleaning process powerful enough to gouge 1-2 µm holes into the PET substrate would likely introduce unwanted features into prints by damaging the laser-imaged patterns of ink-attracting and ink-

The fact that Dr. Gido chose not to explore every possible alternative removal mechanism -- particularly a mechanism that he reasonably dismissed as farfetched -- is not a proper basis for excluding his testimony. This is a matter going to the weight of his testimony, not its admissibility.

3. **Use of AFM and SEM to Measure Ablation**

Creo argues that Dr. Gido's testimony should be excluded because his experimental technique -- using AFM and SEM to measure cratering of the PET, and inferring the degree of ablation from those measurements -- is scientifically unreliable and is a "theory" developed solely for this litigation. This argument has no merit.

If ablation is the main mechanism by which material is removed from a formerly flat surface, then it is common sense that measuring the cratering of that surface is a valid method for determining how much material ablated from it. Indeed, as discussed below, the scientific literature contains numerous examples of AFM and SEM being used to infer how much a laser has ablated a polymer sample.

repelling areas.

Peer-reviewed articles have used SEM to measure ablation in other laser-imaged polymer films used in printing presses. See I-Yin Sandy Lee et al., Dynamics of Laser Ablation Transfer Imaging Investigated by Ultrafast Microscopy, 36 J. Imaging Sci. & Tech. 180, 183 (1992) (using SEM images to track ablation during laser imaging of a laser ablation transfer ("LAT") film); William A. Tolbert et al., High-Speed Color Imaging by Laser Ablation Transfer with a Dynamic Release Layer: Fundamental Mechanisms, 37 J. Imaging Sci. & Tech. 411, 414-15 (1993) (using SEM images to identify irregular ablation patterns after laser imaging of a LAT film). SEM has also been used to measure ablation of polymers in other contexts. See, e.g., Thomas Lippert & J. Thomas Dickinson, Chemical and Spectroscopic Aspects of Polymer Ablation: Special Features and Novel Directions, 103 Chem. Rev. 453, 458 (2003) (using SEM images of ablation craters to draw conclusions about ablation rates); Thomas Lippert et al., Laser Ablation of Doped Polymer Systems, 9 Advanced Materials 105, 108-10 (1997) (discussing several other studies that have used SEM images to draw conclusions about ablation rates and mechanisms).

Similarly, AFM is also used as a means of testing for ablation of polymers. See Himmelbauer, supra at 87-88 (using AFM to investigate surface topology of laser-ablated polyimide foils); Th. Kunz et al., Photoablation and Microstructuring of Polyestercarbonates and Their Blends with a XeCl Excimer Laser, 67 Applied Physics A 347, 348-49 (1998) (using AFM and SEM to measure laser-ablated craters); Lippert, Chemical and Spectroscopic Aspects of Polymer Ablation, supra at 457 (noting that AFM has been used in ablation studies to examine surface topology and crater depths).

Accordingly, there is nothing novel, untested, or unscientific about Dr. Gido's use of SEM and AFM to measure ablation.

4. Accuracy of Measurements of Ablation Depth

Creo argues that Dr. Gido's testimony should be excluded because his measurements of ablation depth are inconsistent with Creo's knowledge of the thickness of the layers of the Clarus WL. Like its criticism of Dr. Gido's conclusion that two PET layers exist, this only calls into question the plausibility of Dr. Gido's *conclusions*, not the underlying principles, methodology,

or inferential leaps he made to support those conclusions. Thus, it goes only to the weight, not the admissibility, of Dr. Gido's testimony. See Daubert, 509 U.S. at 595 ("The focus . . . must be solely on principles and methodology, not on the conclusions that they generate"); Ruiz-Troche, 161 F.3d at 85 ("Daubert does not require that a party who proffers expert testimony carry the burden of proving to the judge that the expert's assessment of the situation is correct"). Accordingly, this critique is not a proper basis for excluding Dr. Gido's testimony.

5. Reliability of Gold Layering Method

Creo argues that Dr. Gido's testimony should be excluded because the gold layer that he applied to the top of the silicone in his supplementary report may have diffused into the silicone layer during the deposition process. Relatedly, Creo argues that Dr. Gido's testimony should be excluded because his decision to microtome the Clarus WL at -60°C, which is above silicone's glass transition temperature of -125°C, caused unnecessary damage to the sample.

As to the gold layer, Creo concedes that depositing a thin (approximately 0.01 µm) metal layer onto the sample is a standard method of preparing the sample for SEM analysis. Creo takes

issue, however, with the thickness of the gold layer, arguing that it increased the likelihood that the gold diffused into the silicone and obscured the true upper boundary of the silicone layer. Creo further argues that a "skilled scientist" would know to place an intervening layer of titanium or chromium between the silicone and gold layers, which would increase the gold's adhesion to the underlying material and decrease the chances that the gold layer would be moved or damaged during microtoming. These factors may call into question the accuracy of Dr. Gido's measurements or otherwise damage his credibility. Nevertheless, Dr. Gido points out that other studies have directly adhered noble metal layers to polymers when microtoming cross-sections of the polymers, see Hongqi Xiang et al., Electrically Induced Patterning in Block Copolymer Films, 37 Macromolecules 5358, 5360 (2004) (adhering an evaporated platinum layer to microtomed silicone), and that the published literature suggests that the diffusion would not be great enough to significantly affect his results. Accordingly, Dr. Gido has made a showing of reliability sufficient to satisfy Daubert. See Ruiz-Troche, 161 F.3d at 85 ("As long as an expert's scientific testimony rests upon good grounds, based on what is known, it should be tested by the

adversary process -- competing expert testimony and active cross-examination -- rather than excluded from jurors' scrutiny for fear that they will not grasp its complexities or satisfactorily weigh its inadequacies" (internal cites and quotations omitted)). Creo's criticisms of his gold layering technique go to the weight, not the admissibility, of his testimony.

As to the cutting temperature, Creo argues that Dr. Gido should have performed his microtoming at -125°C (the glass transition temperature of silicone) to avoid damaging the silicone layer -- a risk that, Creo argues, was especially great in light of his choice to apply a thick gold layer. Dr. Gido responds that he selected a cutting temperature of -60°C to avoid damage to the PET and carbon black layers, which would become brittle and prone to cracking at the temperatures advocated by Creo. Either alternative involves a tradeoff; the question of whether Dr. Gido made the correct tradeoff in the circumstances is a question for the jury, not an issue of admissibility.

IV. CONCLUSION

For the foregoing reasons, Creo's Motion to Exclude Expert Opinions of Dr. Samuel Gido (Doc. No. 131) is denied.

SO ORDERED.

/s/Paul Barbadoro
Paul Barbadoro
United States District Judge

February 8, 2008

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